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ATTORNEY

**UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 9**

In the Matter of:)
)
Fresno Sanitary Landfill)
CITY OF FRESNO,)
)
Respondent)
)
Proceeding under Sections 104, 106,)
and 122 of the Comprehensive)
Environmental Response, Compensation,)
and Liability Act, as amended.)
42 U.S.C. §§ 9604, 9606, & 9622.)
)
)
)

U.S. EPA Docket
No. ~~93~~ 94-07

**AMENDMENT TO ADMINISTRATIVE CONSENT
ORDER U.S. Docket No. 90-22**

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1 National Contingency Plan ("NCP"), 40 C.F.R. Part 300 et seq., the ROD, and the Remedial
2 Design Scope of Work ("RD SOW") a copy of which is attached as Appendix C and is
3 incorporated by reference to this Amendment. The RD SOW requires Respondent to submit a
4 detailed RD Work Plan which specifies work to be performed during the RD, including,
5 among other things, predesign studies, consisting of but not limited to extent-of-trash studies,
6 a landfill gas generation rate characterization and landfill gas quality characterization studies.
7 It also contains a list of reports, including 30%, 60%, 90% and 100% design submittals,
8 documents, and other deliverables that Respondent will provide for EPA review, comment
9 and/or approval.

10 2. The ACO is amended by adding the following Paragraphs F - H to Section III (Findings
11 of Fact):

12 F. On September 21, 1990 EPA and the City signed the ACO (U.S. EPA Docket No.
13 90-22) wherein the City of Fresno consented to conduct the RI/FS.

14 G. Releases of hazardous substances to the environment have taken place at the site
15 during the period of City ownership or operation from 1935 to at least 1989 as a result of
16 escapes, spills, or other events as defined in Section 101(22) of CERCLA, 42 U.S.C.
17 § 9601(22).

18 H. Various response efforts were performed by Respondent concurrent with work on
19 the RI, and were temporary and partial measures in response to the principle threat of
20 migrating landfill gas. The SCOU interim remedy is intended to control migrating landfill
21 gas and obviate any further temporary or partial measures.

22 3. The ACO is amended by adding the following underlined language to Paragraph D, and
23 by deleting the following language from Paragraph E, of Section IV (Conclusions of Law):

24 Paragraph D, Line 22: "§ 9601(22), and has occurred during the period of City
25 ownership or operation."

26 Paragraph E, Line 23: "Respondent is a ~~potentially~~ responsible..."

27 4. The ACO is amended by modifying Section IV (Work To Be Performed) as

28 follows: Page 7, Line 5: "...this Consent Order and Amendment shall..."

Line 12: "...this Consent Order and Amendment."

Line 20: "...complete RI/FS or RD Work, and..."

5. The ACO is amended by adding the following Paragraphs G - L to Section VI (Work To Be Performed):

G. Respondent shall perform the tasks and submit reports contained in the RD SOW contained in Appendix C. Respondent shall also, in addition to the reporting requirements contained in the RD SOW, submit Monthly Progress Reports, on the 10th of each month, to be submitted beginning in February, 1994. All Work shall be conducted in accordance with Appendices B and C, CERCLA, the NCP, and all applicable EPA guidance in effect prior to the commencement of work required hereunder. Deliverables to be submitted by Respondent other than Monthly Progress Reports are listed in the RD SOW. The RD SOW also includes a schedule for performing the RD activities and the submittal of deliverables. All draft deliverables must contain sufficient information to allow for EPA's detailed technical review and comment. Any reports, plans, specifications, schedules and attachments required by this Amendment are, upon approval by EPA, incorporated into this ACO and Amendment by reference.

H. EPA shall approve, disapprove and/or comment and require modifications on each deliverable submitted by Respondent under this Amendment, except for the Health and Safety Plan. In the event of disapproval and/or the need for modification, EPA shall so notify Respondent in writing and shall specify the reasons for such disapproval and/or modification. Respondent shall revise disapproved documents and submit required modifications to EPA as promptly as possible, but not later than thirty (30) days after receipt of the notice of disapproval and/or required modifications, unless a different schedule is given by EPA in writing.

I. In the event of unanticipated or changed circumstances at the Site, Respondent shall notify the EPA Project Coordinator by telephone within 24 hours of the discovery of the unanticipated or changed circumstances.

J. EPA shall have the right to modify the RD Work Plan as it determines necessary

1 after consultation with the Respondent, but will not have the right to shorten the schedule of
2 work to be performed.

3 K. EPA may determine that additional remedial design tasks, including, but not
4 limited to, investigation work and engineering evaluation, are necessary for implementation of
5 the SCOU ROD. Respondent shall implement any such additional tasks which EPA
6 determines are necessary as part of the RD. The additional work shall be completed in
7 accordance with the standards, specifications, requirements, and schedules determined or
8 approved by EPA. Prior to making a demand for additional work, EPA shall provide the
9 Respondent with an opportunity to meet and confer on the requested additional work.

10 L. Documents, including progress and technical reports, designs, approvals,
11 disapprovals, and other correspondence to be submitted pursuant to this Amendment, shall
12 include seven complete copies for EPA review, shall be deemed submitted on the date
13 received by EPA or Respondent and shall be sent to the following addresses:

14 1) Documents to be submitted to EPA shall be sent to:

15 Mr. Bret C. Moxley
16 Remedial Project Manager (H-6-2)
17 Hazardous Waste Management Division
18 U.S. EPA, Region 9
75 Hawthorne Street
San Francisco, CA 94105

19 2) Documents to be submitted to Respondent shall be sent to:

20 Mr. John V. Mitchell
21 Deputy City Manager
22 City of Fresno
2600 Fresno Street
Fresno, CA 93721-3600

23 6. The ACO is amended by adding the following underlined language to Paragraphs A and C
24 of Section VIII (Site Access):

- 25 • Paragraph A, Page 15, Line 17: "...for access and timely implementation of Eminent
26 Domain procedures to acquire access."
- 27 • Paragraph C, Page 16, Line 5: "...and any activity conducted pursuant to the RI/FS
28 work plan and RD work plan...."

1 • Paragraph C, Page 16, Line 7: "...this Consent Order or Amendment..."

2 7. The ACO is amended by adding the following Paragraph C to Section IX (Sampling,
3 Access, and Data/Document Availability):

4 C. While conducting all sample collection and analysis activities required by this
5 Amendment, Respondent shall either follow an approved Quality Assurance Project Plan
6 ("QAPP"), or to the extent such a QAPP does not apply or does not specify the relevant
7 procedures, Respondent shall use the quality assurance, quality control, and chain of custody
8 procedures described in the relevant EPA guidances, in effect immediately prior to the
9 commencement of any work required hereunder. The EPA guidance includes the following:

- 10 - Interim Guidelines and Specifications for Preparing Quality Assurance Project
11 Plans, December 1980, QAMS-005/80
- 12 - Quality Assurance Program Plan for Region 9, Quality Assurance Policies,
13 Procedures and Management Systems, December 1988, Document Control
14 Number 9QA-01-89 (Formerly QA009-008-09-88)
- 15 - Preparation of a U.S. EPA Region 9 Field Sampling Plan for Private and State-
16 Lead Superfund Projects, April 1990 (Document Control No. 9QA-06-89)
- 17 - Laboratory Documentation Requirements for Data Validation, January, 1990,
18 Document Control No. 9QA-07-90
- 19 - Data Review Report Format, September 1989, Document Control No. 9QA-09-
20 89

21 Respondents shall consult with EPA in planning for and prior to, all sampling and
22 analysis as detailed in the RD SOW. To provide quality assurance and maintain quality
23 control, Respondent shall:

24 1. Use a laboratory which has a documented Quality Assurance Program that
25 complies with EPA guidance in effect immediately prior to the commencement of any work
26 required to be performed hereunder.

27 2. Subject to any confidentiality rights and upon the written request of EPA,
28 Respondent shall provide EPA with the QA/QC documentation of all sampling and tests or
29 other technical data generated by Respondent or on Respondent's behalf pursuant to this
30 Amendment.

31 8. The ACO is amended by adding the following underlined language to Paragraphs D, G

1 and H of Section IX (Sampling, Access, and Data/Document Availability):

2 • Paragraph D, Line 27, "...and pursuant to the RD workplan.."

3 • Paragraph G: Line 19, "...and during the RD process.."

4 Line 21, "...and the RD work plan,..."

5 • Paragraph H, Line 24, "Except for information that is afforded protection in
6 accordance with Section IX.F above, [a]ll data,..."

7 9. The ACO is amended by adding the following underlined language to Section X (Record
8 Preservation):

9 • Page 19, Line 6, "...and the RD work plan."

10 10. The ACO is amended by adding the following underlined language to Section XI
11 (Dispute Resolution):

12 • Page 19, Line 17: "...Section VI(B), (D), or (E), or Section VI(H), (J) or (K) of
13 this Amendment,..."

14 • Page 20, Line 3: "...this Consent Order or this Amendment."

15 11. The ACO is amended by adding the following Paragraphs E - H to Section XII
16 (Stipulated Penalties) of the ACO:

17 E. Class I noncompliance with the terms of this Amendment shall be defined as the
18 following:

19 Failure to submit the final Pre-Design Report, the 30%, 60%, 90% and 100%
20 draft submittals, the final Remedial Design Work Plan, or resubmittals if EPA determines that
21 the draft submittals are inadequate, as required under this Amendment and the RD SOW, and
22 failure to perform additional work.

23 F. For the purposes of this Amendment, Class II noncompliance with the terms of this
24 Amendment shall be defined as the following:

25 Failure to submit outlines and draft versions for the Pre-Design Report and
26 Remedial Design Work Plan,

27 G. For the purposes of this Amendment, Class III noncompliance with the terms of
28 this Amendment is defined as a failure to submit Monthly Progress Reports as required by the

RD SOW, or failure to comply with any other requirement of this Amendment, with the exception of any failure that is defined as Class I or II.

H. Stipulated penalties under this Amendment shall accrue in accordance with the following schedule:

Class I Noncompliance Penalty Schedule

<u>Day</u>	<u>Penalty per Day</u>
1 - 7	\$ 5,000 /day
8 - 14	10,000 /day
15 - 30	15,000 /day
After 30 days	20,000 /day

Class II Noncompliance Penalty Schedule

<u>Day</u>	<u>Penalty per Day</u>
1 - 7	\$ 500 /day
8 - 14	1,000 /day
15 - 30	2,000 /day
After 30 days	5,000 /day

Class II Noncompliance Penalty Schedule

<u>Day</u>	<u>Penalty per Day</u>
1 and beyond	\$ 500 /day

I. With respect to all deliverables defined as Class I in Paragraph E of this Section, for each 2-day period any such deliverable is submitted ahead of schedule, Respondent shall receive one-day credit for any future penalties that might accrue for any Class I violation for failure to meet a deliverable schedule.

12. The ACO is amended by adding the following underlined language to Section XIV (Reservation of Rights):

- Page 24, Line 6: "...Order and this Amendment..."
- Line 9: "Consent Order or this Amendment..."
- Line 13: "...this Consent Order or this Amendment."

Line 17: "...RI/FS work plan or RD SOW or workplan,... Consent Order or this Amendment."

Line 21: "Notwithstanding any other provisions of this Amendment, the City reserves all rights or defenses that it has, including but not limited to any defenses against any enforcement actions, actions for injunctive relief, monetary penalties, and punitive damages, or its ability to pursue cost recovery against any parties pursuant to CERCLA.

13. The ACO is amended by adding the following underlined language to Section XV (Reimbursement of Response and Oversight Costs):

- Paragraph A, Page 25, Line 2: "..this Consent Order including the Amendment thereto."
- Paragraph B, Page 25, Line 16: "..Consent Order or Amendment..."
- Paragraph B, Page 25, Line 19: "Respondent reserves the right to defend against such actions."

14. The ACO is amended by adding the following underlined language to Section XVI (Other Claims):

- Paragraph A, Line 2: "Neither this Consent Order nor the Amendment releases Respondent...."
- Paragraph B, Line 10: "...this Consent Order and Amendment."

15. The ACO is amended by adding the following underlined language to Section XVII (Other Applicable Laws):

- Page 26, Line 13: "...Order and Amendment..."
- Line 16: "...Order and Amendment."

16. The ACO is amended by adding the following underlined language to Section XVIII (Indemnification of the United States Government):

- Page 26, Line 23: "...Consent Order and Amendment."

17. The ACO is amended by adding the following underlined language to Section XIX

1 (Community Relations/Public Review):

- 2 • Page 27, Lines 4 and 5: "RI/FS Work Plan, the ROD, the RD Scope of Work and
3 RD work plan, will be...."

4 18. The ACO is amended by adding the following underlined language to Section XX

5 (Effective Date and Subsequent Modification):

- 6 • Paragraph A, Line 8: "This Order and Amendment..."
7 • Paragraph B, Line 13: "...this Consent Order and Amendment."
8 • Paragraph C, Line 17: "...this Consent Order and Amendment."

9 19. The ACO is amended by adding the following underlined language to Section XXI

10 (Parties Bound):

- 11 • Page 27, Line 19: "This Consent Order and Amendment..."
12 Lines 22, 23, 24, 25: "...Consent Decree and Amendment..."
13 • Page 28, Lines 1, 2, 3: "...Consent Decree and Amendment..."

14 20. The ACO is amended by adding the following underlined language to Section XXII

15 (Notice To The State):

- 16 • Page 28, Line 8, "...Consent Order, Amendment...and the RD SOW."

17 21. The ACO is amended by adding the following the following underlined language to

18 Section XXIII (Termination and Satisfaction):

- 19 • Page 28, Lines 11 and 14: "... Consent Order and Amendment..."

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1
2 IT IS SO AGREED AND ORDERED:

3 UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

4
5 By: 

Date: 12-17-93

6
7 CITY OF FRESNO

8 By: Michael Q. A. Beirman

Date: 12-2-93

CITY OF FRESNO

FRESNO SANITARY LANDFILL

**REMEDIAL DESIGN OF THE
SOURCE CONTROL OPERABLE UNIT**

SCOPE OF WORK

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1.0 INTRODUCTION AND OBJECTIVES

1.1 Introduction

1.1.1 Scope of Work

This Scope of Work (SOW) details the activities to be undertaken by the City of Fresno in compliance with this Amendment to the Administrative Consent Order (AACO) and the National Contingency Plan.

1.1.2 Work

The Work includes all activities necessary for the implementation of the Predesign and Design of the Gas Control System, Gas Treatment System, Cover System, Surface Water Management System and the irrigation supply pipeline traversing the site. Finally, the Work also includes the development and implementation of management plans as well as communication procedures.

The basic elements of the Work shall include:

- a) The Gas Control System including:
 - Gas Collection Component
 - Liquids Collection Component
 - Liquids Treatment Component
 - Gas Monitoring Component
- b) The Cover System including:
 - Cover Component
 - Cover Protection Component
 - Access and Bench Road Component
- c) The Surface Water Management System including:
 - Drainage pipes and channels
 - Roadway and bench ditches
 - Retention/siltation basins, if required
 - Other appurtenances which convey and control surface water run-off generated by storm events, run-on and irrigation operations
- d) The Gas Treatment System including
 - Flare, and Control Components
 - Gas Treatment Monitoring Component
 - Backup Systems

1.1.3 Format

The SOW is presented in the following format:

- The remainder of Chapter 1.0 discusses the objectives for the work activities
- Chapter 2.0 describes the management plans to be prepared to guide work activities performed pursuant to this SCOU & AACO.
- Chapter 3.0 provides the description of the Predesign Activities.
- Chapter 4.0 provides the description of the design activities.
- Chapter 5.0 defines the product deliverables and review procedures.
- Chapter 6.0 defines the work schedule described in the SOW.

1.2 Objectives

1.2.1 SOW Objectives

This section states the overall objectives for the Work performed pursuant to this AACO. In addition, the objectives for components of the Work are summarized herein. The overall objective for the Work is to design the Gas Control System, Gas Treatment System, Cover System and Surface Water Management System to meet Performance Standards.

1.2.2 Performance Standards

Performance Standards shall be defined to be those cleanup standards, standards of control and other substantial requirements, criteria or limitations, set forth in the Source Control Operable Unit (SCOU), Record of Decision (ROD) the AACO, and this SOW. The City of Fresno shall meet the Performance Standards as set forth in this AACO.

- a) The California Integrated Waste Management Board, Title 14, Sections 17783 and 17783.9 requires the control and monitoring of landfill gases to include trace gases to prevent adverse acute and chronic exposure to toxic and/or carcinogenic compounds. The City of Fresno shall control the substances listed below to maintain the level of protection specified by 40 C.F.R. § 300.430(e)(2)(i)(A) of the National Contingency Plan (NCP).

The trace gases to be monitored, sampled and controlled for at the Fresno Sanitary Landfill (FSL) site shall be:

1,2-Dichloroethane
1,1,1-Trichloroethane
Benzene
Trichloroethylene
Methylene Chloride
Tetrachloroethylene
Vinyl Chloride

During the implementation of this AACO, EPA may require that trace gases be added to this list for monitoring; and the City of Fresno may request that trace gases be removed from the list for monitoring subject to EPA approval.

- b) The California Integrated Waste Management Board, Title 14, Section 17783.5, sets forth the location requirements for the perimeter monitoring network. Due to site factors to be considered in placing probes and the possibility that trash may be located at or beyond the property boundary, consideration of an alternate boundary will be permitted.
- c) The landfill gas treatment facility, constructed and operated by the City of Fresno, must meet performance criteria such that emissions from the facility shall not exceed a level, as determined by EPA, which would cause a 10^{-6} excess cancer risk as determined pursuant to the California Air Pollution Control Officers Association (CAPCOA Air Toxics "Hot Spots" Program Risk Assessment Guidelines (January 1991). Additionally, as a threshold minimum the remedy must also meet the requirements of the Solid Waste Disposal Sites - Draft Rule 46-42, which requires:
 - a reactive organic destruction efficiency of 98% for any reactive organic except methane;
 - that flares must be enclosed in a shroud; and
 - that the maximum concentration of organic compounds measured as methane, measured at any point on the surface of the landfill, shall not exceed 1000 ppm.

1.2.3 Gas Control System: including the Gas Collection Component, Liquids Collection Component, Gas Monitoring Component and Gas Treatment Component.

a) Gas Collection Component

The gas collection component will consist of the extraction wells, vacuum piping, vacuum pumps, monitoring probes and their appurtenant features. Objectives include the following:

- Minimize subsurface gas migration
- Minimize surface emissions
- Maximize collection system efficiency
- Maximize potential for removal of recovered liquids

b) Liquids Collection Component

The liquids collection component will consist of equipment to collect condensate and/or leachate and to pump liquids from gas wells if required for gas control, or to extract leachate which may be a threat to groundwater as determined by EPA. The liquids collection component will include related piping and appurtenances required to collect and convey recovered liquids to an appropriate location for treatment or storage. Objectives include the following:

- Minimize the potential for system upsets
- Minimize the impact of system upsets
- Maximize collection of recovered liquids
- Treat or dispose of properly recovered liquids from the gas control system to the appropriate standards

c) Gas Monitoring Component

The Gas Monitoring Component will include equipment and procedures for monitoring and sampling as appropriate for: probes and wells, landfill surface emissions, landfill gas quality and quantity, condensate quantity monitoring, methane levels in on-site structures, and other monitoring and sampling required to demonstrate compliance with Performance Standards. Monitoring objectives include the following:

- Determine compliance with Performance Standards established for the Site
- Provide data to assist in the efficient operation of landfill gas flares

- Determine changes in landfill gas production rates which could affect operation control procedures for the Site

1.2.4 Cover System: including the Cover Component and Access and Bench Road Component

a) Cover Component

The Cover Component will consist of the low permeability layer(s) and the materials required to support, stabilize and anchor the low permeability layer(s), and will include either the following or a combination of the following:

- The vegetative growth required to protect the Cover System; any topsoil necessary to support the vegetative growth, if required; and the irrigation system, if required, including the pumps, pipes, valves, sprinklers, nozzles, drip emitters, and other appurtenances employed for delivery of irrigation water to natural landscaping
- A non-vegetative layer composed of earthen and/or synthetic materials subject to regulatory agency approval.

The functional objectives of the Cover Component include the following:

- Maximize control of surface emissions of landfill gas
- Minimize surface water infiltration into the refuse prism
- Minimize liquid percolation into the Cover System
- Minimize oxygen intrusion
- Minimize degradation or cracking of the low permeability layer
- Minimize erosion
- Minimize irrigation water consumption
- Minimize fire potential
- Minimize maintenance requirements
- Consider aesthetics

b) Access and Bench Component

The Access and Bench Road Component includes all access and bench roads at the Site. Objectives for the Access and Bench Road Component include the following:

- Maximize all-weather accessibility for completed access and bench roads

- Minimize maintenance requirements for completed access and bench roads
- Provide adequate space for installation, operation and maintenance of components of Site systems located at completed access and bench roads
- Maintain access required for operations during construction

1.2.5 Surface Water Management System

The facilities to manage surface water run-off generated by storm events, run-on and irrigation operations consist of drainage pipes and channels, retention and siltation basins if required, access and bench road ditches, and other appurtenances which convey and control surface water run-off. The Surface Water Management System objectives include the following:

- Minimize surface water infiltration
- Minimize erosion
- Minimize maintenance requirements
- Minimize off-site impacts related to run-off water quality and quantity
- Maximize all-weather site accessibility
- Prevent surface water run-on
- Retention basin/detention basin
- Minimize the adverse impact on subsurface groundwater quality

1.2.6 Gas Treatment Component

The gas treatment component will consist of treatment flares, control components, gas treatment monitoring components and backup systems. Objectives include the following:

- Minimize subsurface migration
- Minimize surface emissions
- Maximize collection system efficiency
- Maximize destruction of the collected landfill gas
- Minimize the potential for system upsets
- Minimize the impact of system upsets

2.0 MANAGEMENT PLANS

2.1 Objective

2.1.1 Purpose

The purpose of the management plans is to provide a framework by which this SOW is to be executed. The management plans to be prepared include the following:

- Work Plan
- Safety, Health and Emergency Response Plan (SHERP)
- Quality Assurance/Quality Control Plan (QA/QC Plan)
- Sampling Plans (to be incorporated into the above listed plans as appropriate)

2.2 Plans

2.2.1 Work Plan

The Work Plan shall be the primary plan to control and guide the Work activities to be carried out under the Order. It shall describe the procedures the Contractor will employ to perform the activities required and the specific objectives of these activities. Development of the Work Plan will be in accordance with EPA guidance. The objectives of the Work Plan are to provide a detailed description of the tasks to be performed, information needed for each task, information to be produced during and at the conclusion of each task, and a description of the work products that will be submitted to EPA. This includes the deliverables set and a project management plan. Also to be included is a staffing element which addresses each of the work activities. The personnel assigned to the project shall be identified by discipline and project responsibility. The staffing approach to the construction management and operation activities of the project shall include a preliminary organization for field positions and home office support involvement.

A schedule for predesign sampling activities shall be included in the Work Plan. A standardized incident report format shall be established and provided in the Work Plan.

2.2.2 Safety, Health and Emergency Response Plan

The SHERP shall establish safety, health, and emergency response procedures for all Work activities to be conducted by the City of Fresno. The SHERP shall address both workers at the site and public exposure to releases or spills at and from the site. The SHERP shall address

coordination between the various person(s) conducting work at the site. The SHERP shall include at least the following basic elements:

- Introduction and Purpose
- Onsite Organization and Coordination
- Medical Surveillance Program
- Chemicals of Concern
- Activities Hazard Analysis
- Site Control, Work Zones, and Security Measures
- General Safe Work Practices
- Training
- Personnel Protective Equipment
- Onsite Work Plans
- Standard Operating Safety Procedures
- Communication Procedures
- Monitoring Plan (Personnel and Environment)
- Decontamination Procedures
- Work Disruption Notification Procedures
- Emergency Response Plan, including:
 - A Contingency Plan
 - Identification and responsibilities of an Emergency Coordinator
 - Coordination with persons or organizations responsible for off-site emergency response (e.g. Fire Departments)
- Procedures for updating and distributing the SHERP
- Record keeping

2.2.3 Quality Assurance/Quality Control Plan

The QA/QC Plan shall establish quality procedures for all activities to be conducted by the City of Fresno. Addenda to the general QA/QC Plan and specific sampling plans shall be prepared as required for specific activities such as landfill gas characterization activities. The QA/QC Plan shall include the following basic elements:

- Project organization and qualifications of QA/QC manager and staff
- Sampling and sample custody procedures, including the sample site selection rationale
- Analytical methods/procedures
- Analytical/statistical/control procedures, including requirements for accuracy, sensitivity, precision, sample quantities, calibration procedures, preventative maintenance, internal quality control checks, representative samples and data comparability
- Data handling, analysis and reporting
- Data validation procedures
- Alternative test procedures
- Requirements for subcontractors
- Procedures for special activities

If necessary, amendments to appropriate portions of the QA/QC Plan shall be provided with each design package.

2.2.4 Sampling Plans

The Sampling Plan will be prepared to ensure that predesign sample collection and analytical activities are conducted in accordance with technically acceptable protocols and that the data meet Data Quality Objectives (DQO). The Sampling Plan provides a mechanism for planning field activities. Whether for monitoring and sampling activities, or for other activities, the Sampling Plan shall comply with EPA guidelines and shall include at least the following components:

- Sampling rationale and description of techniques used in selecting sampling sites (e.g., random, stratified, etc.)

- Specific sampling, preservation, and preparation procedures used, extraction methods, analytical references or descriptions (including sample size, types of sample containers, applicable samplers, etc.). For nonstandard or modified sampling methods, detailed procedures with appropriate references are required.
- Sampling program organization, if needed.
- Description of sample container and sampler cleaning procedures for each type of container to be used following EPA guidelines or other appropriate procedures
- Procedures to avoid sample contamination
- Sample preservation methods and holding times, following EPA SW-846 guidelines or other appropriate references.
- Sample transportation requirements (following EPA and Department of Transportation guidelines, as applicable)
- Chain-of-Custody procedures, following the National Enforcement Investigations Center Policies and Procedures Manual (as revised), and the National Enforcement Investigations Center Manual for the Evidence Audit, (as revised) as well as EPA SW-846 guidelines, and other appropriate references
- Procedures and responsibility for data validation, as appropriate.

3.0 PREDESIGN ACTIVITIES

Except as modified by the Work Plan, the predesign activities shall include the following:

3.1 Subsurface and Geologic Information Evaluation

This activity addresses the evaluation of subsurface information to define the limits of the trash and foundation conditions for the Cover System, and characterize geologic conditions which will impact perimeter gas control well locations and depths.

- a) Subsurface and geologic information required for the predesign activities should be adequate to perform evaluation and selection processes, if appropriate, and determine requirements for detailed design activities. To the extent possible, this information should be determined from data developed during Remedial Investigation/Feasibility Study (RI/FS)

activities. If necessary, the predesign program may include special field investigations to supplement that existing data.

b) The evaluation of subsurface the geologic conditions shall include, as necessary, the following:

- Determination of the limits of trash at landfill perimeters
- Determination of geotechnical properties of materials which will form the foundation for buttresses, the bottom layer of cover, and structures or tanks associated with gas and liquid conveyance systems.
- Determination of geological properties which could affect gas migration pathways

3.2 Landfill Gas Characterization

This activity addresses characterization of the landfill gas to be collected and treated. Quality characterization of the landfill gas shall include the following:

- The distribution of various landfill gas qualities
- The fluctuation of gas qualities by season and changing trends with time, which shall continue through at least a portion of the design phase of this SOW
- The range of concentrations of methane and oxygen which the flares must be capable of handling and the potential for upset conditions to occur
- Trace gases which influence design and operation of the flares

Gas quantity estimates for the FSL shall include consideration of the following:

- Gas generation and collection rate trends over time
- The range of landfill gas generation rates
- The spatial distribution of landfill gas generation rates throughout the landfill
- The range of potential landfill gas collection rates

The estimates shall consider the relationship between gas quality and collection rates. The impact of various gas extraction rates on gas quality in terms of methane and oxygen shall be evaluated.

3.3 Selection Criteria Determination

This activity addresses the establishment of selection criteria to be utilized during the system selection for each component of the Work. Selection criteria shall be determined based on the Objectives and Performance Standards identified in Section 1.2 of this SOW.

Selection criteria shall be established for each major element of the Work Systems, as necessary, including:

- Gas Treatment System
- Gas Control System
- Cover System
- Surface Water Management System

3.4 Alternatives Identification

This activity addresses the identification of configuration alternatives to be considered for each major component of the Work and the criteria to be used for final selection of components where more than one alternative is considered. Selection of components shall be determined based on an evaluation of how alternatives satisfy the objectives stated in Section 1.2 of this SOW. Alternative evaluations should address the issues described below.

a) Gas Control System

Gas Control System alternatives shall examine a range of collection system concepts. These may include interior wells, slope wells, and boundary wells as appropriate for the integrated performance of gas control and cover systems. Consideration for maximizing the potential for liquids collection shall be evaluated. A comparative evaluation of a range of construction materials and construction techniques shall be performed.

b) Cover System

The barrier layer shall consist of a 60 mil HDPE flexible geomembrane or an approved alternative. The following design standards need to be considered and evaluated:

1) Geomembrane

- Geomembrane compatibility (i.e. compatibility with site specific gases, fungi, etc.);

- Biaxial stress on the geomembrane due to waste settlement;
 - Planar stress on the geomembrane due to downslope slippage or creep of cover soils at sideslope areas;
 - Geomembrane degradation due to the effects of swelling, chemicals, oxidation, temperature extremes, compound extraction, landfill gases, cracking as a result of applied stresses (tensile and biaxial), punctures, rodents, microorganisms, rooting, vehicles, etc;
 - Geomembrane lifetime;
 - Geomembrane field installation, including anchoring and seaming methods;
 - Geomembrane repair (i.e. patching, reseaming, etc.)
 - Geomembrane leak detection;
 - Geomembrane grade control (i.e. resin type and percent composition)
- 2) Selection of the irrigation system shall consider minimization of water use. A range of water delivery systems may be evaluated including impact-head sprinklers, spray heads, and drip emitters.
- 3) Cover protection alternatives to be evaluated shall include a variety of seed mixes. The planting of shrubs and trees may be evaluated where feasible. EPA shall make an assessment of community acceptance as part of this evaluation.
- c) **Surface Water Management System**
 In selecting the type, size, and location of the drainage structures making up the Surface Water Management System, the design storm and storm events resulting in structure overflows shall be evaluated. Slope drain analysis may examine a range of materials and configurations; for example, steel or plastic pipe and open channels constructed of asphalt or concrete with flexible joints. The analysis shall incorporate an assessment of off-site impacts in terms of the quantity and quality of the run-off leaving the site and the quantity and quality of sediment and debris conveyed off-site.

d) **Gas Treatment System**

The gas treatment facility shall provide for either thermal destruction of the landfill gas or energy recovery. Air modeling shall be performed to assist in the determination of the optimum site in terms of overall protection of human health and the environment. Additional factors to evaluate include an assessment of noise and odor impacts on the environment.

3.5 Data Collection and Engineering Calculations

This activity addresses the engineering calculations, including the collection of additional information and data necessary to make the final selections for components where more than one option is being considered.

- a) If required, special data gathering efforts should be identified as early as possible to minimize impacts to the predesign schedule. To the extent possible, these requirements should be identified during development of the Work Plan and incorporated into activities described in Section 3.1 through 3.4 of this SOW. Testing or evaluation of materials or methods may be necessary during later stages of the predesign process.
- b) Analyses of alternatives, when appropriate, should include adequate engineering analyses to determine the degree to which selected system components satisfy the selection criteria. Examples of types of analyses which may be necessary include:
- Slope stability calculations of cover or foundation conditions for static and dynamic conditions.
 - Gas collector well system analyses to determine spacing and/or depth requirements anticipated to satisfy performance requirements.
 - Potential borrow sources for cover soils.
 - Evaluation of construction equipment, personnel and material requirements to estimate a range of costs.
 - Longevity evaluations of system components to project anticipated long-term operation and maintenance requirements for alternatives.

3.6 System Selection

This activity addresses the selection of the preferred alternative for each component of the Work.

- a) The selection process shall be based on an evaluation of how alternatives satisfy the objectives stated in Section 1.2 of this SOW.

- b) The selection process shall address long-term operation, maintenance and monitoring considerations.

3.7 Predesign Report Preparation

The results of the predesign activities shall be used to prepare a Predesign Report. When approved by EPA, this report shall direct the design activities. The Predesign Report shall include the following elements:

- a) Introduction and Purpose
- A description of the Predesign Report contents, structure and objectives.
- b) General Description of the Selected Components
- The types of Gas Control System, Gas Treatment System, and Cover System Components selected for various areas of the Site and the rationale for that selection.
 - The selected Surface Water Management System alternative and the manner in which its design and construction will be integrated with the Gas Control and Cover Systems.
- c) Presentation of Selection Criteria
- A presentation of the selection criteria applied for the development of the selected Systems which addresses the objectives set forth in Section 1.2 of this SOW.
- d) Summary of the information obtained from field investigations and other studies which will impact design activities, such as:
- Existing system conditions and performance data, including the cover, wells, probes, gas collection pipes, and flare stations.
 - Subsurface conditions including the limits of trash at landfill perimeters and with respect to the property line.
 - A slope stability evaluation assessing the stability of the landfill slopes with the selected Cover System applied under static and dynamic conditions.
 - Well construction techniques and materials.

- Well spacing and location for both interior and perimeter gas extraction wells.
 - Cover system cross sections.
 - Landfill gas quality and quantity.
- e) A presentation of any additional factors considered in formulating the selected systems
- f) Description of Alternatives Evaluated
Alternative components, configurations, alignments, locations and operation and maintenance considerations shall be evaluated for:
- Gas Collection System Components
 - Gas Treatment System Components
 - Cover System Components
 - Surface Water Management System Components
- g) Detailed Descriptions of the selected systems, including:
- The gas collection system construction techniques, materials and locations.
 - Anticipated requirements for pumping of liquids from wells or probes.
 - Special perimeter preparation requirements.
 - Cross sections for the selected cover systems for specific portions of the site.
 - Selected gas and liquid conveyance pipeline alignments.
 - Selected configuration for the surface water management control system, including failure modes for storms larger than design storms.
 - Selected irrigation system components and distribution network for specific areas of the Site.

- Selected type(s) of vegetation and/or synthetic cover system(s) for specific areas of the Site.
 - Preliminary discussion of construction contractor procurement procedures for the different system components.
 - Observations, monitoring procedures and criteria to be used to evaluate constructed system performance and determine where additional components may be necessary.
- h) Preliminary construction scheduled and phasing concepts, including:
- The general manner in which construction activities will be phased, if appropriate.
 - Procedures for establishing the construction schedule for construction activities including areas where construction of well, probe or surface collector installations or hookups may be phased to determine the most appropriate spacings, and depths to satisfy conditions at specific locations.

4.0 DESIGN ACTIVITIES

4.1 Introduction

The design activities shall result in the preparation of the Final Design Documents necessary for the construction of the Work.

The design shall present assurance that Performance Standards as described in Section 1.2.2 of this SOW are analyzed and incorporated into the design. Design parameters dictated by these Performance Standards shall be identified.

The design shall be submitted for review at four (Preliminary - 30%, Intermediate-60%, Prefinal-90% and Final 100%) levels of completeness.

4.2 Preliminary 30 % Design

Except as modified by the Predesign Report, the Preliminary-30% Design Package shall include at least the following:

- a) Design Drawings including:
- Index Sheet
 - Plan of existing site conditions including edge of trash
 - Property boundary and survey control plan

- Overall Site general arrangement plan
- Foundation layer grading plan
- Perimeter system general arrangement plan(s)
- Details and sections of main gas control features
- Details and sections of main cover and access road features
- Drainage control plan, general direction of flow control
- Irrigation system plan, main location only

b) Design Calculations including:

- Table of Contents for calculation appendix to Design Report
- Basis for Survey Control
- Gas influence calculations for specific perimeter system locations
- General gas influence calculations for slope and top deck
- Final range of gas quantity and quality estimates
- Final condensate and pumped liquid quantity estimates
- Preliminary gas migration control modeling
- Final landfill settlement estimates
- Static and seismic stability analyses

c) Design Report including:

- Table of Contents
- Description of Existing Systems
- General design concept and criteria
- Description of overall surface water management plan
- General description of monitoring systems
- Description of each completed calculation including the basis of parameters and adequacy of results

- Identification of any permits, regulatory agency approvals and access agreements required for the Work.
- General construction/procurement process
- Preliminary description of intergration requirements.
- Listing of Performance Standards and a discussion including applicable analysis, of how each performance standard will be satisfied
- Description of off-site facilities required
- Location of systems with respect to residences
- Description of Construction Staging areas
- Table of Contents for the Construction Quality Assurance Plan

4.3 60% Design Package

Except as modified by the Predesign Report, the Intermediate - 60% Design Package shall include at least the following:

a) Design Drawings including:

- Drawings from Preliminary - 30% Design, revised as appropriate
- Typical details and cross sections for perimeter preparation and access requirements
- Details and section of main cover and access road features
- Miscellaneous gas control, cover and access road details and sections
- Main surface water management system details and sections
- Miscellaneous surface water management system details and sections
- Preliminary Vegetation Plan
- Preliminary Irrigation System Plan
- Monitoring System Plan

- Main monitoring system details and sections
 - Mechanical and electrical instrumentation sheets
 - Plan showing how existing systems will be modified and system integration locations, perimeter modifications only
 - Details and sections for existing system modification, perimeter modifications only
 - Monitoring system plan, perimeter only
 - Monitoring system details and section, perimeter only
- b) Design Specifications including:
- Revised table of contents for technical specifications
 - Preliminary specifications for main gas control, cover, surface water management features and Gas Treatment
- c) Design Calculations including:
- Items from Preliminary - 30% Design, revised as appropriate
 - Final Gas emission and migration modeling results
 - Static and seismic stability for proposed configurations
 - Hydrologic calculations used to determine flow rates for the Surface Water Management System design
 - Drainage structure hydraulic calculations
 - Specific gas influence calculations for slope and deck systems
 - Evaluation of landfill settlement effects on slope and deck systems
 - Infiltration through and erosion of cover
 - Access road design
 - Slope stabilization structure design, if any

- Gas Header Calculations
 - Blower Capacity Calculations
- d) Design Report including:
- Items from Preliminary - 30% Design Report, revised as appropriate
 - Description of perimeter preparation procedures
 - Descriptions of major Gas Control and Cover Systems
 - Description of overall surface water management plan
 - General description of monitoring systems
 - Construction monitoring procedures for:
 - Verifying system performance
 - Determining requirements for design modifications
 - Description of each of the completed calculations including the basis for parameters and adequacy of results
 - Discussion of how each performance standard is expected
 - Preliminary construction schedule including phasing:
 - The specific manner in which construction activities will be phased, if appropriate
 - The schedule of construction activities if any, where construction of well, probe or surface collector installations or hookups may be phased to determine the most appropriate spacings and depths to satisfy specific location conditions.
 - Description of staging area requirements, size and location and layout yard for the construction contractor(s).
 - Preliminary Construction Quality Assurance Plan in accordance with appropriate portions of AA/530-SW-86-031 guidelines including procedures for constructing the low permeability cover materials.
 - Preliminary Compliance Testing Plan

4.4 90 % Design Package

Except as modified by the Predesign Report, the Prefinal-90% Design Package shall include at least the following:

- a) Design Drawings including:
 - Drawings from Intermediate - 60% Design, revised as appropriate
 - Miscellaneous gas control, cover and access road details and sections
 - Vegetation and Irrigation system details and sections
 - Miscellaneous monitoring system details and sections
- b) Design Specifications including:
 - Items from Intermediate - 60% Design revised as appropriate.
 - Final technical specifications for items to be constructed.
 - The special provisions sections of the specifications shall identify the contractors' responsibilities while on-site and special contractor requirements such as quality control procedures, health and safety precautions.
 - Special conditions, construction and equipment specifications for handling of liquids encountered during well installation.
- c) Design Calculations including:
 - Items from Intermediate - 60% Design, revised as appropriate
 - Detailed design calculations for gas and liquid collection systems
 - Miscellaneous civil calculations
 - Minor drainage structure calculations
 - Irrigation system calculations
 - Preliminary quantity estimates

d) Design Report including:

- Items from Intermediate-60% Design, revised as appropriate
- Completion of detailed description of Gas Control, Cover and Surface Water Management Systems
- Descriptions of Irrigation and Vegetation Systems
- Description for each new calculation
- Copies of required permits, regulatory agency approvals, and access agreements obtained; or schedules for obtaining any outstanding permits, regulatory agency approvals and access agreements prior to construction start
- Final construction schedule, including phasing
- Final Construction Quality Assurance Plan
- Format for the Construction Completion Report
- Final Compliance Testing Plan

e) Bid Packages

- Bid Packages for Work

f) Draft Operation and Maintenance Plan

- Provisions to be included to assure access required for construction, maintenance and monitoring of the Work.
- A Draft Operations and Maintenance Plan will be prepared and will address the activities required for proper operation and long-term maintenance of the environmental control systems at the FSL including providing for appropriate service visits by experienced personnel to supervise the installation, adjustment, startup and operation of the control systems, and appropriate operational procedures training once the startup has been successfully accomplished. This document will provide a detailed description of equipment, normal operations and maintenance, potential operating problems, and routine monitoring and laboratory testing. The plan will also include a safety plan to address safety precautions.

4.5 100 % Design Package

Except as modified by the Predesign Report, the Final-100% Design Package shall include at least the following:

- a) Design Drawings including:
 - Revision to Prefinal - 90% Design Drawings, as appropriate
- b) Design Specifications including:
 - Revision to Prefinal-90% technical and general condition specifications, as appropriate
- c) Design Calculations including:
 - Revisions to Prefinal-90% calculations, as appropriate
 - Final quantity estimates
- d) Design Report including:
 - Revisions to Prefinal - 90% Design Report, as appropriate
- e) Bid Packages:
 - Revisions to Bid Package(s) for work, as appropriate
- f) Amendments to SHERP and QA/QC Plans if required to:
 - Incorporate design systems
 - Provide for methods to measure compliance with Performance Standards
 - Incorporate Final Construction Quality Assurance Plan
- g) Prefinal Operations and Maintenance Plan reflecting EPA comments to the DRAFT operations and maintenance plan.

5.0 DELIVERABLES AND REVIEW PROCEDURES

5.1 Deliverables

The following items are considered to be deliverables under this AACO:

5.1.1 Predesign Deliverables

- a) Work Plan
 - Work Plan Outline
 - Draft Work Plan
 - Final Work Plan
- b) Safety, Health and Emergency Response Plan
 - SHERP Outline
 - Draft SHERP
 - Final SHERP
 - Amended SHERP, if necessary
- c) Quality Assurance/Quality Control Plan
 - QA/QC Plan Outline
 - Draft QA/QC Plan
 - Final QA/QC Plan
 - Amended QA/QC Plan, if necessary
- d) Predesign Report
 - Predesign Report Outline
 - Draft Predesign Report
 - Final Predesign Report

5.1.2 Design Deliverables

- a) Design
 - Preliminary - 30% Design
 - Intermediate - 60% Design
 - Prefinal - 90% Design
 - Final - 100% Design
 - Final Operation Plan

5.2 Review Procedures

Review conferences are established to provide a format for presentation of EPA's review comments to the City of Fresno. This will facilitate the incorporation of EPA comments into the next phase of the work submittal.

5.2.1 Management Plans

The Work Plan, SHERP, QA/QC Plan, and Operations Plan shall undergo the following review procedure:

- Plan Outline Submittal
- Review Conference
- Draft Plan Submittal
- Review Conference
- Final Plan Submittal

5.2.2 Predesign Report

The Predesign Report shall undergo the following review procedure:

- Report Outline Submittal
- Review Conference
- Draft Report Submittal
- Review Conference
- Final Report Submittal

5.2.3 Design

The Design shall undergo the following review procedure:

- 30% Preliminary Design Submittal
- Review Conference
- 60% Intermediate Design
- Review Conference
- 90% Prefinal Design Submittal
- Review Conference
- 100% Final Design Submittal

6.0 SCHEDULES

6.1 Introduction

This Section provides schedules for deliverable reports. If EPA determines it is appropriate, the time periods set forth pursuant to this schedule may be extended without requiring a formal modification of this AACO. Requests for schedule modifications made by the City of Fresno should include a discussion of the reason

for the request. The City of Fresno may choose to submit deliverables prior to the scheduled deliverable date. To the extent appropriate, the City of Fresno shall confirm to EPA the calendar date of subsequent deliverables. The following time periods apply to this project.

- The work plan outline shall be due to EPA 5 weeks after the signature of the AACO.
- The work plan shall be due to EPA eight weeks after receipt of EPA approval of the work plan outline.
- The pre-design report outline shall be due to EPA three weeks after receipt of EPA approval of the work plan.
- The pre-design report shall be due to EPA 23 weeks after receipt of EPA approval of the pre-design outline.
- The 30% conceptual design shall be due to EPA 15 weeks after receipt of EPA approval of the pre-design report.
- The 60% intermediate design shall be due to EPA 16 weeks after receipt of EPA written comments to the 30% conceptual design.
- The 90% pre-final design shall be due to EPA 22 weeks after receipt of EPA written comments to the 60% intermediate design.
- The 100% final design shall be due to EPA 11 weeks after receipt of EPA written comments to the 90% pre-final design.